A STUDY OF THE DEGRADATION OF PROPARGITE (OMITE) ON STRAWBERRY FOLIAGE AND FRUIT IN VENTURA COUNTY, CALIFORNIA APRIL 1977

By

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INTRODUCTION

Progargite (Omite) is an acaricide with contact and residual killing action. It has an oral LD_{50} (rat) of 2200 mg/kg. Propargite is a known skin irritant. It is not a skin sensitizer, but does cause dermatitis when it comes in contact with the skin, especially if the person is hot and sweaty. This study was conducted in order to determine the levels of pesticide residue that persist on strawberry plants after application, that workers might have hand contact with when working with strawberry plants.

Progargite is used to control many types of mites on many crops, including almonds, grapes, cotton, corn and strawberries. In 1976, nearly 6,700 pounds were reportedly applied to more than 3,836 acres of strawberries. It is sold in pesticides under the trade names of Omite and Comite. Since Omite is not a restricted material, sizable additional amounts may have been applied by growers.

Omite is available as a 30% wettable powder, an emulsifiable concentrate containing 6 pounds per gallon and a 4% dust. The formulation used in this study was the 30% wettable powder. Label directions call for five to ten pounds per acre in 100 gallons of water.

APPLICATION

Application of pesticides was made to 15 acres of strawberries at the following rates:

Propargite (Omite) - 10 lbs./acre
Orthocide (Captan) - 4 lbs./acre
Thiolux (Sulfur) - 5 lbs./acre
100 gallons of water/acre

The application was made by two ground applicator rigs on April 4, 1977. A previous pesticide application had been made about one week earlier to this same plot with Benlate and Orthocide.

SAMPLING

Samples were taken at 1, 2, 3, 8 and 9 days post-application. Duplicate leaf samples and one fruit sample were taken at each interval. The leaf samples each consisted of approximately 100 leaf discs 2.5 cm in diameter. The leaves sampled were those closest to the berries. Fruit samples consisted of approximately 25 strawberries, collected along the same diagonal path as the leaf samples.

ANALYTICAL METHODS (Extraction)

The procedure used for the extraction of dislodgeable and total residues from leaf punches was originally published by Gunther in "The Bulletin of Environmental Contamination and Toxicology", 9, 243-249, 1973. It has been documented several times in detail, with modifications that were made to accommodate the various pesticides and their metabolites, that our Department's Worker Safety Unit has been concerned with.

The sample container and leaf punches are weighed and the gross weight recorded.

Total Residues

1. The leaf punches are transferred to a blending jar. The empty sample container is again weighed and the net weight of the punches recorded.

2. Approximately 50 gms of sodium sulfate and 100 mls of ethyl acetate are added.

3. The sample is blended at high speed for 3 minutes, keeping the blender cup cool by immersing it in a container of cool water. The blender cup is removed and the sample allowed to settle.

4. An aliquot is decanted into a teflon-capped bottle and stored in the freezer prior to clean up and analysis.

Dislodgeable Residues

1. Fifty mls of water and approximately 4 drops of Sur-Ten solution (1:50) are added to the sample containers. The containers are capped and placed in a multi-purpose rotator and rotated at 30 cycles/min. for 60 min. The aqueous solution is decanted through a glass wool plug into a 500 ml separatory funnel.

2. The punches are rotated a second time, using 50 mls of water and 4 drops of Sur-Ten solution, for 30 min. This is added to the first extraction.

3. The sample is then hand-shaken for approximately 10 secs with 30 mls of water. The container is drained into the separatory funnel with the first two extractions.

4. The aqueous solution is extracted three times with 50 ml of ethyl acetate. The extract is filtered through sodium sulfate into a glass stoppered mixing cylinder and the volume is recorded. The extract is mixed in the cylinder. An aliquot is decanted into a teflon-capped bottle and stored in the freezer prior to clean up and analysis.

The residue in the fruit was run the same way as total in the foliage.

ANALYTICAL METHODS (CHROMATOGRAPHY)

Instrument: Varian 2100
Detector: Flame photometric, sulfur filter, attenuation 64 x 10^{-9}
Column: 6' x 2mm I.D.; 50/50 mix 4% OV-101 and 6% OV-210 on 100/120 Gas Chromasorb Q
Column temp: 230° C
Carrier gas: Nitrogen at 30 ml/min
Retention time: 3.0 min

RESULTS

The daily temperatures and precipitation during this study are recorded on Table 1. The average maximum and minimum temperatures were 68.4 and 47.0°F, respectively. There was no rainfall and the fields were not sprinkler irrigated.

Total and dislodgeable residues of the foliage and total residues of the fruit are recorded on Table 2 and Figure 1. The tolerance for propargite residues on strawberries is 7 ppm. In this study residues on the berries did not reach that level. Surface residues on the foliage started at 120 ppm one day after application and were still 16.4 ppm one week later. Total residues in and on the foliage were 170 ppm one day after application and were 47.8 ppm one week later.

TABLE 1: DAILY TEMPERATURE AND PRECIPITATION

April 1977	Temperature		Precipitation (Inches)
	Maximum	Minimum	
4-4	69	45	0.0
5	71	45	0.0
6	71	51	0.0
7	67	50	0.0
8	65	51	0.0
9	66	51	0.0
10	67	44	0.0
11	69	45	0.0
12	69	47	0.0
13	70	41	0.0
Average	68.4	47.0	Total 0.0

TABLE 2: PROPARGITE RESIDUES ON STRAWBERRY FOLIAGE APRIL 1977

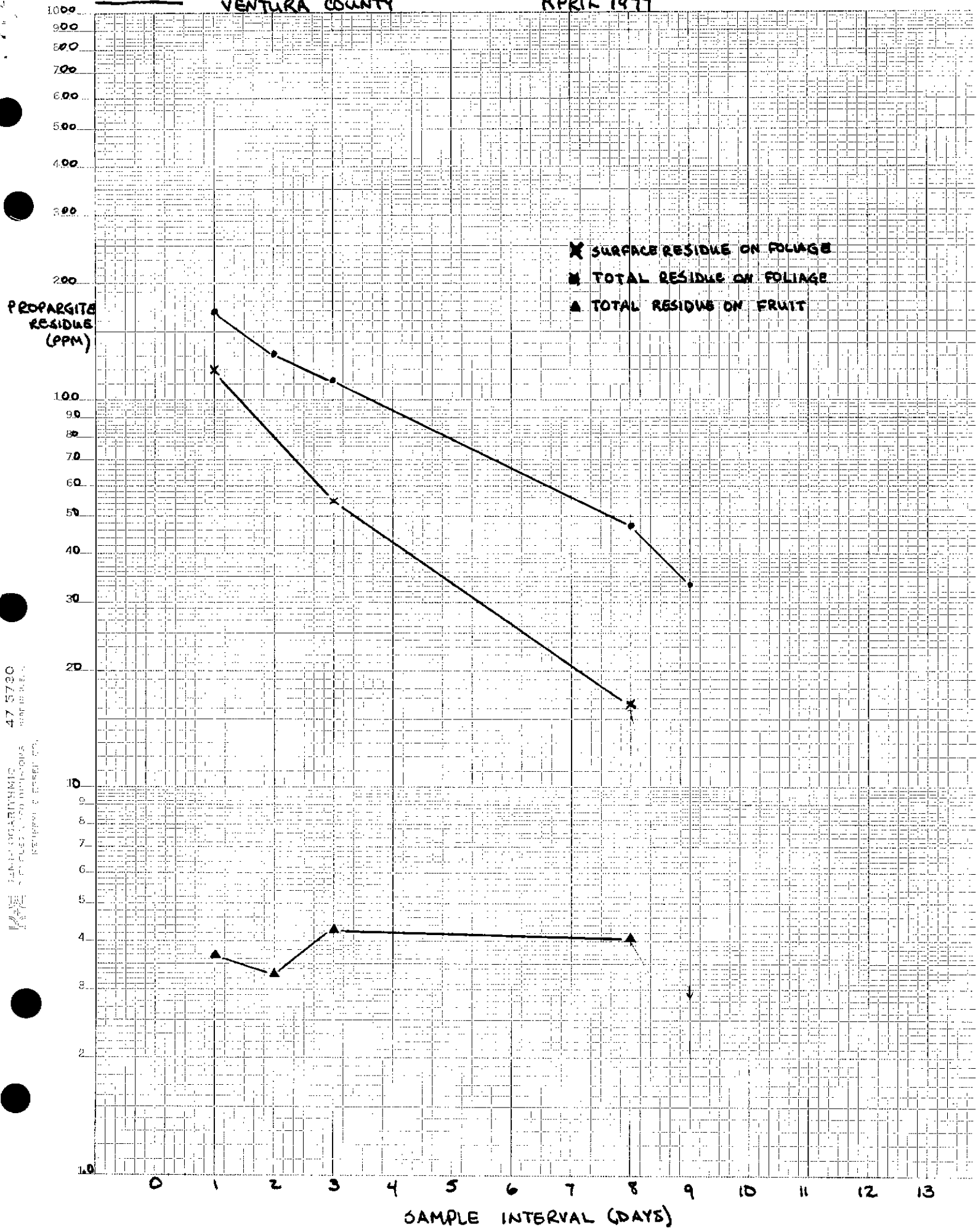
April 1977	Sample Interval	Propargite Residue (PPM)	
		Surface	Total
5	1 day	120	170
6	2 days	Sample lost	130.2
7	3 days	56.4	113
12	8 days	16.4	47.8
13	9 days	None detected	33.4

* Limit of detection is 3 ppm.

TABLE 3: PROPARGITE RESIDUES IN STRAWBERRY FRUIT APRIL 1977

April 1977	Sample Interval	Total Propargite Residue (PPM)
5	1 day	3.7
6	2 days	3.3
7	3 days	4.3
12	8 days	4.1
13	9 days	None detected

FIGURE 1: PROPARGITE RESIDUES ON STRAWBERY FOLIAGE AND FRUIT
VENTURA COUNTY APRIL 1977



Addendum to HS-377
Recalculation of Dislodgeable Residues

Results of Analysis of Strawberry Foliage for
Dislodgeable Residues of Propargite

Sample Interval	Residue (ug/cm2)
Pre-app	ND
Pre-app	ND
1 day	.627
2 days	ND
3 days	.326
8 days	.104
9 days	ND

ND - none detected